



ELECTRICITY SITUATION IN THE GAMBIA

By: Research & Library Unit, National Assembly.

2019

Research & Library Unit



TABLE OF CONTENT

ABSTRACT.....	2
INTRODUCTION.....	2-3
POWER GENERATION.....	3-5
KARPOWERSHIP.....	5
TRANSMISSION AND DISTRIBUTION.....	5-6
CHALLENGES AND OPPORTUNITIES.....	6-8
CONCLUSION.....	8
REFERENCES.....	9

ABSTRACT

Electricity is one of the major determinants of the economic prosperity of any country. It plays a significant role in undertaking daily activities from cooking, lighting, heating to powering machines in the industrial sector. It is also essential for quality healthcare delivery, education, effective communication, and many more; serving as the building block on which every sector of a nation's economy thrives. This emphasizes how crucial and indispensable electricity is for human existence in the 21st century.

Policy makers need to pay greater attention in the supply of electricity to enhance sustainable economic growth. The regulation of electricity in The Gambia falls under the purview of the Public Utility Regulations Authority (PURA).¹ National Water and Electricity Company Limited (NAWEC Ltd.) is the main electricity supplier in the Gambia.²

This paper looks at the capacity of NAWEC in providing electricity from power generation, transmission, distribution and the challenges and opportunities in the supply of electricity across the country.

INTRODUCTION

Gambia's electricity sector dates back to 1972 when it was Gambia utilities Corporation (GUC) which was responsible for supplying and conserving electricity and water in the country. GUC was formally dissolved in 1993 by an Executive Order. The Management Services Gambia Ltd. (MSG) and the Utilities Holding Corporation (UHC) were task to take over the functions of GUC. Under the new agreement, the responsibility of managing the asset profitability was given to UHC while MSG (owned by a French company, SOGEA) was awarded the operating lease. MSG's lease was terminated by the Government in February 1995, thereby leaving the management of assets and operations to UHC.³

NAWEC Ltd was established in June 1996 under the companies Act of 1955 as a Public Limited Liability Company. The company is engaged in the generation and provision of electricity, water and sewerage services for domestic, public and industrial purposes. NAWEC is governed by a Board of Directors which is appointed by the Honourable Minister for Petroleum and Energy. The Managing Director, who is appointed by the President, is responsible to directly oversee the operations of the company.⁴

The Assets of the company are owned by the Government but managed and operated by NAWEC. The Gambia government currently holds 97% of the company's share, Gambia Ports Authority, Social Security and Housing Finance Corporation and Gamtel all have 1% share respectively.⁵ Although NAWEC has achieved financial sustainability for its normal operations,

¹ Electricity Act: CAP 66:01 Act NO.8 of 2005.

² Access Gambia: <https://www.accessgambia.com/information/nawec-water-electricity.htm> Retrieved: 18th Sept 2019.

³ NAWEC: About NAWEC, nawec.gm

⁴ NAWEC: About NAWEC, nawec.gm

⁵ Primary Data, Interview: NAWEC Executives, 12th Sept 2019

it still lacks the resources to properly expand the electricity system. Due to this, the system is considered ill-equipped to satisfy the growing demand and therefore needs substantial investment for maintenance and expansion.⁶

POWER GENERATION

Power generation is the first stage of electricity production. An electricity generator is a device that converts a form of energy into electricity. Generators that convert kinetic (mechanical) energy into electrical energy produce nearly all of the electricity that consumers use. NAWEC generates electricity through machines installed in various power stations. The main power station is located at Kotu. There are three other power stations located in Brikama namely Brikama 1, Brikama 2 and Brikama 3. Brikama 3 is undergoing a set-up and is not fully functional for now. These power stations are responsible for generating electricity to supply power from Banjul to Kalaji and all powers are connected to one network called the grid – an interconnected network through which power is generated, transmitted and distributed.

NAWEC generates electricity at about 33000 volts (33kv) from power stations to primary sub stations where it is transformed to 11000 volts (11kv) that travels to the secondary substations which finally convert power to around 400 to 220 volts for customer’s consumption. 400 volts is normally for the industrial sector and residential consumers receive electricity at 220. In comparison, ESKOM power stations generate electricity in South Africa at about 22000 volts (22kv), while NAWEC produces power at about 33000 volts (33kv).⁷

The tables below show the number of generators used in the various power stations within the Greater Banjul Area (GBA), their fuel type, installed capacity, available capacity and the dates they were commissioned.

KOTU POWER STATION

Generator No.	Fuel Type	Installed Capacity Mega Watt (MW)	Available Capacity (MW)	Commissioning Date
G1	Light fuel oil (LFO)	3.00	0.00	1981
G2	LFO	3.00	0.00	1981
G3	Heavy fuel oil (HFO)	3.40	0.00	1997
G4	HFO	6.40	5.50	2001
G5	HFO	11.10	11.00	2018

⁶ http://nawec.gm/?page_id=171 Retrieved: 18th Sept 2019.

⁷ Primary Data, NAWEC Executives, 12th Sept 2019

G6	HFO	6.40	0.00	1990
G7	HFO	6.40	5.50	2001
G8	HFO	6.40	0.00	2001/2018*
G9	HFO	6.40	0.00	2009
TOTAL		52.50	22.00	

BRIKAMA 1 POWER STATION

Generator No.	Fuel Type	Installed capacity (MW)	Available capacity (MW)	Commissioning Date
G1	HFO	6.40	5.50	2006
G2	HFO	6.40	0.00	2006
G3	HFO	6.40	0.00	2006
G4	HFO	6.40	5.50	2006
G5	HFO	6.40	5.50	2013
G6	HFO	6.40	0.00	2013
G7	HFO	6.40	5.50	2018
TOTAL		44.80	22.00	

BRIKAMA 2 POWER STATION

Generator No.	Fuel Type	Installed capacity (MW)	Available capacity(MW)	Commissioning Date
Wartsila	HFO	8.9	8.5	2011/2018*
TOTAL		8.9	8.5	

BRIKAMA NEW POWER STATION

Generator No.	FUEL TYPE	Installed capacity (MW)	Available Capacity(MW)	Commissioning Date
DG1	HFO	9.20	0.00	
DG2	HFO	9.20	0.00	
TOTAL		18.40	0	
GRAND TOTAL		<u>124.60</u>	<u>52.50</u>	

The above power stations as illustrated have power generators that use both Heavy Fuel Oil (HFO) and Light Fuel Oil (LFO) to generate electricity. Their installed capacities as demonstrated are the capacity of the power generators when they were installed. The available capacity refers to its current capacities in Mega Watts and the commissioning dates refer to the time at which the generators were commissioned.

There are four other power stations located in the provinces that generate electricity for the consumers in the provincial settlements namely Basse, Bansang, Farafenni and Barra. Apparently, the provincial settlement in The Gambia obtains electricity from Senegal through the NAWEC-SENELEC power supply agreement between Senegal's electricity company and Gambia's NAWEC. It is believed to be cheaper to obtain electricity from Senegal to supply the rural dwellers. The power stations in the provinces are only used when the suppliers in Senegal are in maintenance or when it is not available for some other reasons. Transnational Energy Supply is believed to be a cost effective strategy in the energy sector. Like The Gambia, Spain also generates part of its electricity from morocco to supply other parts of their country at a cheaper rate. Electricity is a commercial sector and countries minimize their cost as much as possible to provide affordable energy to their consumers.⁸

KARPOWERSHIP

Karpowership is a member of Karadeniz Energy Group in Istanbul, Turkey. The group is a pioneer in innovative energy projects for the last twenty years, with investment in domestic and international markets. It is the first private electricity exporter in Turkey. Today, the group owns and operates more than 3,800 MW installed capacity globally. In December 2018, they signed a contract with the National Water and Electricity Company Ltd. (NAWEC) to deploy a powership of 35 MW for a period of two years. Karpowership has been supplying 80% of Gambia's total electricity needs. In comparison, they have been supplying 26% of Ghana, 100% of Guinea Bissau, 10% of Mozambique, 80% of Sierra Leone, 10% of Sudan's electricity, etc.⁹

TRANSMISSION AND DISTRIBUTUON

The next stage following power generation is the transmission of electricity generated from power stations to a usable voltage before it is finally distributed. The functions of the primary and secondary substations are to transform electricity for distribution. When electricity is generated at 33000 volts (33kv), it then travels along the power lines to the primary substations where it is transformed to 11000 volts (11kv). It is further passed to the secondary sub stations that retransform it to about 400 to 220 volts making it ready for customer consumption. The

⁸ Primary Data, NAWEC Executives, 12th Sept 2019

⁹ Karpowership: Projects, <http://www.karpowership.com/en/karpowership> Retrieved: 15th October, 2019.

industrial sector mostly has its own substations at which power is transformed to a voltage consumable at their level.¹⁰

The overall motive behind electricity generation and transmission is to supply power to the areas where they are needed. NAWEC distribute electricity to its esteemed customers at a voltage of about 400 to 220 volts for consumption. 400 volts is normally distributed for the industrial sector and 220 volts for the residential consumers. Customers from all sectors buy power from NAWEC before electricity is accessible to them via their various meter numbers. 56.2% of the population of The Gambia have access to electricity that is all dependent on NAWEC.¹¹ NAWEC generates its revenue in electricity mostly in the distribution stage where money is exchanged for energy.

CHALLENGES AND OPPORTUNITIES

Obsolete Generators

The Gambia's electricity generation has suffered setbacks in producing power to supply its customers. One of the major challenges outlined by NAWEC is the obsolete state of generators in their power stations. Some generators have been in use since the '80s as illustrated in the tables above. A close examination of the commissioning dates of the generators in the various power stations shows that most of the generators have been in use for a very long time and need proper maintenance or, at best, replacement.

This problem persists due to the unavailability and costly nature of spare parts for the generators and the high cost of maintenance. It has led to a depreciation of the capacity of the generators in Mega Watts. The tables above show that the installed and available capacities of the generators and it is clearly indicated how some generators drastically depreciated to zero in capacity which led to their inability to generate electricity. This eventually led to the instability of electricity supply because generators with 0.00 available capacities cannot supply power which in turn puts pressure on other generators and power stations.

There is a new power station setting up in Brikama that will also help in the generation and supply of electricity. This will lessen the pressure on other power plants in the generation of electricity. International stakeholders have been supporting NAWEC in the generation and supply of electricity. The objective of the World Bank electricity support project is to increase the availability and reliability of electricity supply for existing customers in The Gambia. The US\$18.5 million project was approved in 2016 and set for completion in 2020. The project was aimed at improving NAWEC's generation capacity and efficiency in the existing Kotu and Brikama thermal power plants. This was in a form of rehabilitation and replacement of required

¹⁰ Primary Data, NAWEC Executives, 12th Sept 2019

¹¹ The World Bank: Access to electricity, <https://data.worldbank.org/indicator/eg.elc.accs.zs> Retrieved: 23rd Sept 2019.

equipment, provision of critical spare parts and financing urgent maintenance activities. This support is critical in view of the worsening generation scenario in The Gambia.¹²

Low Capacity

Depreciation of capacity of the transformers due to overload is a challenge the company is faced with. Basically, an overload in the transformers is as a result of people moving to other areas that increase the number of consumers connected to a transformer in those areas and raising the demand for energy. The higher the number of people connected to a transformer the more likelihood the transformer gets congested that lead to low capacity of voltage transmitted.¹³

Losses in electricity transmission and distribution

Electricity in The Gambia suffers losses during the transmission and distribution. The longer the current flows before it reaches its destination, the more losses occur in the voltage of electricity as a result of old lines that were in use since independence. According to NAWEC, this hinders the transmission process because when electricity is generated, it travels along these power lines to the destinations where they are needed for transformation and a loss of electricity occurs along the line. Losses of current have a negative impact on the revenue protection of the company. NAWEC reported that electricity travels a long distance before it reaches its customers because there are limited primary and secondary substations along the distribution channel.¹⁴

Inadequate funding

This is a major challenge NAWEC claims to be facing in provision of reliable and affordable electricity in The Gambia. According to NAWEC, the limited availability of funds has affected their power generation, transmission and distribution. The inability to maintain and replace old and obsolete power generators, inadequate number of primary and secondary substations, insufficient fuel and inability to replace old lines some of which are in use since independence are major bottlenecks NAWEC is undergoing. NAWEC revealed that they spend an estimated amount of 118 million dalasis monthly on fuel in the Greater Banjul Area alone to keep the generators in operation.

The energy sector has been attracting support over the years; an International organisation like the World Bank is supporting NAWEC to increase electricity access in The Gambia. In January 2019, The Gambia got a grant of \$66 million to increase electricity access in pre-urban and rural areas to cover localities within a 100km radius of the Soma and Brikama OMVG substations in The Gambia. This project is a World Bank program to develop an ECOWAS Regional

¹² World Bank: Gambia Electricity support project: <http://projects.worldbank.org/P152659?lang=en> Retrieved: 23rd Sept 2019.

¹³ Primary Data, NAWEC Executives, 12th Sept 2019

¹⁴ Primary Data, NAWEC Executives, 12th Sept 2019.

Electricity Access with the objective to increase grid electricity in selected ECOWAS countries which The Gambia is among.¹⁵

NAWEC and Sinohydro Corporation, a Chinese company, signed a \$165 million electricity project in 2017. The project was aimed at providing a new HFO power plant with a capacity of more than 60MW as a medium of intervention to provide adequate and stable power supply in the Greater Banjul Area. The success of this project will have wide ranging effects on the economy, including increased access to electricity, stable and affordable power supply which would also lead to the establishment of more industries and businesses, employment creation and poverty alleviation.¹⁶

CONCLUSION

The Gambia is committed, under the supervision of NAWEC, to provide access to electricity to all. The Ministry of Energy, through the Board of Directors of NAWEC, intervenes towards the utility sector in order for them to achieve their policy objectives of “sustainable energy for all” in the country. The country’s electricity has always been challenging despite significant efforts made to improve the situation.

The ministry has successfully validated The Gambia Electricity Sub-sector Roadmap which provides the pathway that Government wishes to take, to provide affordable, efficient and sustainable energy for all Gambians. There has been supports from the bilateral and regional partners such as The World Bank, Africa Development Bank, European Investment Bank, Islamic Development Bank, the Republic of Senegal, and Peoples Republic of China, Organization of Islamic Conference (OIC), OMVG and ECOWAS.

The roadmap, which is in line with the National Development Plan (NDP), provides for the least cost of energy production with emphasis on renewable and regional energy trade. This, backed by a robust transmission and distribution network, is expected to increase the affordable and quality energy access rate of 60 to 80% by 2025.

¹⁵ **The Point:** Gambia gets \$66Million ECOWAS energy grant, <http://thepoint.gm/africa/gambia/article/gambia-gets-66million-ecowas-energy-grant> Retrieved: 24th Sept, 2019.

¹⁶ **The Point:** NAWEC signs \$165 million electricity project with China, <http://thepoint.gm/africa/gambia/article/nawec-signs-165m-electricity-project-with-china> Retrieved: 24th Sept, 2019.

REFERENCES

Electricity Act: CAP 66:01 Act NO.8 of 2005

Access Gambia: <https://www.accessgambia.com/information/nawec-water-electricity.htm>
Retrieved: 18th Sept 2019

Access Gambia: <https://www.accessgambia.com/information/nawec-water-electricity.htm>
Retrieved: 21st Sept 2019

Primary Data, Interview: NAWEC Executives, 12th Sept 2019

http://nawec.gm/?page_id=171 Retrieved: 18th Sept 2019.

The World Bank: Access to electricity, <https://data.worldbank.org/indicator/eg.elc.accs.zs>
Retrieved: 23rd Sept 2019.

World Bank: Gambia Electricity support project: <http://projects.worldbank.org/P152659?lang=en>
Retrieved: 23rd Sept 2019.

The Point: Gambia gets \$66Million ECOWAS energy grant,
<http://thepoint.gm/africa/gambia/article/gambia-gets-66million-ecowas-energy-grant>
Retrieved: 24th Sept, 2019.

The Point: NAWEC signs \$165 million electricity project with China,
<http://thepoint.gm/africa/gambia/article/nawec-signs-165m-electricity-project-with-china>
Retrieved: 24th Sept, 2019.

Foroyaa: NAWEC Board of Directors Inaugurated, <https://foroyaa.gm/nawec-board-of-directors-inaugurated/> Retrieved: 24th Sept, 2019.

Karpowership: Projects, <http://www.karpowership.com/en/karpowership> Retrieved: 15th October, 2019